

the greater or less quantity of stem that had been buried and is now gathered and sold with the root."

The authors who have most fully treated this subject, however, regard the roots as imbued with a red colour while growing, and undergoing no change in this respect from subsequent circumstances. Many manufacturers, ignorant of this fact, to whom I submitted my observations, and showed the roots passing through all the stages of colour up to that which they attain when reduced to powder, while they formerly exhibited no trace of a red hue, have positively assured me that this remark would certainly lead to modifications in their manufacture. The assumption of a red colour is therefore a chemical phænomenon quite independent of vitality, while the yellow hue, on the contrary, seems to arise from a vital action which forbids the first; thus, if I place, for comparison, two portions of root, one living and the other dried, in a bottle, the former will preserve its yellow hue, while the second turns red, and in two days ends by acquiring a violet tinge.

Finally, the better to establish the vital power of the cells, and to prove that the production of the colouring principle was entirely determined by their peculiar action, I caused two young *madder plants* to germinate in distilled water; they grew very little, but the tissue of their roots notwithstanding secreted a yellow fluid, the tint of which seemed to me quite as decided as in young plants of equal size raised in earth. This colouring therefore depends on a peculiar action of the cellular membranes, to solve which it would be necessary first to solve that hitherto inscrutable problem of the vital powers\*.

XXX.—*Catalogue of the Slender-tongued Saurians, with Descriptions of many new Genera and Species.* By JOHN EDWARD GRAY, Esq., F.R.S., Senior Assistant in the Zoological Department of the British Museum, &c.

THE Saurian reptiles may be divided into two nearly equal groups; one having a short, thick, slightly-nicked papillary tongue, and the other a more or less elongated forked tongue.

\* [We shall reserve the author's analysis of the stems for a future Number of the *Annals*.—EDIT.]

The former of these groups contain two very distinct sections; the one consisting of the nocturnal lizards, as the *Geckoes*, which are easily known by the structure of their eyes and the composition of their skulls; and the other the diurnal lizards, as the *Agames*, *Chamæleons* of the Old World, and the *Iguanas*, which are confined to the new continent; the former have permanent teeth placed on the edge of the jaw, while the latter have them placed on the inner side of the jaw, below the edge, where they are gradually replaced by new ones as their edges become worn down by use.

As Messrs. Dumeril and Biberon have lately published a work on the species of the thick-tongued lizards, leaving the description of the new species which I have of that group for the present, I at once proceed to the revision of the family and genera of the slender-tongued kinds, and describe the various new species which have come under my observation either in the National Collection or Museum of the Army Medical Board at Chatham.

The British Museum Collection of these animals is one of the richest that I have ever had the opportunity of examining, as the novelties of this catalogue will fully prove; and as it is daily receiving additions, I hope by the time that it is removed into its new locality it will be one of the most extensive in Europe.

Since the publication of the Synopsis of Reptiles, and my other papers on these animals, I have been induced to propose a new arrangement of them, of which the following table may be considered as an outline.

I. Typical group. Scaly Reptiles. (*Squamata*.) Body covered with scales; tympanic bones distinct; skull formed of separate bones.

1. Saurians. (*Saura*.) Jaws united by a bony suture; legs 2 or 4, rarely wanting.

Including the Saurian and Ophidosaurians of my former arrangements, except the genera *Amphisbena* and *Chirotes*.

2. Ophidians. (*Ophidia*.) Jaws very dilatible, only united by a membrane; legs none, or hid under the skin.

II. Annectant groups. Shielded Reptiles. (*Cataphracta*.) Body covered with square imbedded shields; tympanic bones inclosed in the skull, which is formed of hard united bones.

3. Amphisbenians. (*Amphisbena*.) Body cylindrical, with rings of square shields; penis double.

4. Chelonians. (*Chelonia*.) Body depressed, inclosed in a bony case, formed of the expanded ribs and sternum; penis simple; legs 4; jaws toothless.

5. Emydosaurians. (*Emydosaura*.) Body depressed, elongate, in-

closed between two shields formed of square plates; penis simple; legs 4; jaws toothed.

These orders appear to be analogous to the following Orders of Mammalia and Birds.

Reptiles.	Mammalia.	Birds.
SAURIANS . . . . . (Climbers) . . . . .	PRIMATES . . . . .	PASSERES.
OPHIDIANS . . . . . (Carnivorous) . . . . .	FERÆ . . . . .	ACCIPITRES.
—————		
EMYDOSAURIANS . (Aquatic) . . . . .	CETE . . . . .	ANSERES.
CHELONIANS . . . . (Large-hoofed) . . . . .	UNGULATA . . . . .	GALLINÆ.
AMPHISBENIANS . (———?) . . . . .	GLIRES . . . . .	GRALLÆ.

Slender-tongued lizards. (*Sauræ Leptoglossæ.*) Tongue elongate, more or less slender, with the apex forked or bifid; eyes diurnal, generally provided with two connivent valvular eyelids; pupil round; body subcylindrical; the feet formed for walking; toes unequal, the outer hinder one being lower down and rather opposable to the rest.

Section I. Tongue contractile; head with regular normal shields; scales four-sided or lozenge-shaped, placed in rings.

Subsection 1. *Sides covered with small granular scales; scales and shields in transverse and longitudinal series.*

\* *Sides rounded; head pyramidal; femoral pores distinct; throat scaly.*

#### Fam. I. TEIDÆ.

Head pyramidal; supra-orbital plates horny; collar double; throat with scales. Confined to the New World.

\* *Throat with two cross folds; the scales in the middle between them 6-sided; abdominal shields smooth; tail rounded; nostrils between two large nasal plates.*

a. *Abdominal shields small, longer than broad; dorsal scales small, equal.*

TEIUS, Merrem. *Podimema*, Wagler. *Monitor*, Fitz. Toes 5—5; tail round; “teeth on the edge of the jaw; front ones conical, hinder very blunt.”

*Teius Teguxin*, Variegated Lizard, *Shaw, Zool.* t. 73. *Lacerta Teguxin*, Linn. *Tupenambis Monitor*, *Daud.—Spir.* t. 19. *Teius nitor*, *Merrem. Seba*, t. 96. f. 23. *P. Max.* t. from life.

South America.

CTENODON, Wagler. “Tail round; toes 5—5; teeth on the inner side of the jaws; front pectinately lobed, hinder 3-lobed, rest like *Teius*.” Wagler.

*Ctenodon nigropunctatus*, Wagler. *Tupen. nigropunctatus*, *Spix, Braz. t.*

Inhab. South America.

ACRANTUS, Wagler. *Teius*, Fitz. Toes 5—4; tail round; teeth 6, front maxillary simple, with two rather acute transverse tubercles.

*Acrantus viridis*, Wagler. *Lacerta Teyou. Daud.*

Inhab. South America. (From the Berlin Mus.)

b. *Abdominal shields smooth, broader than long; thighs shielded beneath.*

AMEIVA, Cuv., Fitz. *Cnemidophorus*, Wagler. Toes 5—5.

*Ameiva punctata*. *Teius Ameiva, Merrem.—Spix. Braz. t. 23. P. Max. Beytr. t. —. good.* *A. vulgaris, Lichst.?* *A. Argus, Fitz.?* *Guerin, Icon. Rept. t. 4. f. 1.* Olive; nape and front of back black speckled, sides with bands of black-edged white or yellow spots; abdominal shields 12-rowed.

Inhab. Demerara. Capt. Sabine, R.E.

*Ameiva undulata*, Seba, i. t. 88. f. 2. Olive brown with narrow brown wavy cross-bands; sides dark, pale, mottled with a palish streak on the upper part of each side; throat white; chest and belly greenish; sides dark, greenish, spotted; abdominal plates 12-rowed.

Inhab. —

*Ameiva maculata*, Seba, i. t. 88. f. 1.—t. 90. f. 7.? *A. lateristriga, Cuv.* Olive-green; back spotted, with a broad black streak down each side, edged beneath with a narrow white streak; sides and the black streaks, with cross-bands of small white spots; abdominal shields 10-rowed.

Var. back scarcely spotted, paler on each side near the lateral streak.

Inhab. Brazil.

*Ameiva guttata*. *Teius cyaneus, Cuv. T. cyaneus, var. Merrem. from Seba, ii. t. 105. f. 2. Lacép. i. t. 31. Seps murinus, Laur.* Olive-green; sides darker, with 6 or 7 cross-rows of 3 or 4 large white spots; abdominal plates 10-rowed.

Inhab. —

Probably the green-spotted lizard, Edw. Birds, t. 203; but our specimen is bleached, and does not show any pale tapering dorsal streaks. The tail of this specimen has been partly broken, and another false tail has sprouted from the crack. Such specimens are not uncommon in the animals of this family, hence they have been called *forked-tailed lizards*.

*Ameiva dorsalis*, Sloane, Jam. iii. t. 273. f. 3. Olive; back with a

pale central streak, commencing with a point in the nape, and gradually increasing in width to the thighs, with two wide black and two very narrow white lines on each side of it, and the lower part of the sides with two series of bluish spots; abdominal plates 10-rowed, lateral ones bluish-spotted.

Inhab. South America, Jamaica.

*Ameiva lineata*. *A. cœrulescephala*, Cuv.? *Daud. from Seba*, i. t. 91. f. 3. Bluish; back with 5 broad, dark, and 6 narrow, bluish white lines; sides white-spotted; belly greenish; abdominal plates 8-rowed; præanal plates 5.

Var. 1. The dark vertebral streak divided into two by a narrow central pale one.

Var. 2. Upper part of sides with an additional pale streak.

Var. 3. Younger; sides not spotted; back and sides with 10 linear, pale streaks. *Lac. Lemniscatus*, Linn. *Am. Lemniscata*, Cuv. *from Seba*, i. t. 92. f. 4.

Inhab. ———.

\*\* *Throat with a collar of large shields.*

a. *The collar and ventral shields lanceolate, imbricate, keeled; thighs beneath scaly; nostrils between two nasal plates; tail round.*

ACANTHOPYGA. *Pseudoameiva*, Fitz. Scales of the back large, keeled; keels continuous; of the sides small, granular.

*Acanthopyga striata*. *Lacerta striata*, *Daud. Merrem. Wetter. Ann.* i. t. 1. *Pr. Max.* t. 13. *Guerin, Icon.* t. *Kentropyx striatus*, Fitz.

Inhab. Brazils.

CENTROPYX. *Trachygaster*, Wagler. *Acanthopyga*, Leach. The scales of the back moderate, ovate, keeled; of the sides rather smaller; of the belly very large.

*Centropyx calcaratus*.

b. *The ventral shields 4-sided, smooth, as long as broad; nostrils in the centre of a trigonal nasal shield; tail compressed.*

ADA, Gray. *Dracæna*, *Daud. Thorictis*, Wagler. Scales of the back unequal, larger ones oval; tail with a serrated crest on each side above. "Teeth on the edge of the jaw."

*Ada Crocodilurus*. *Teius Crocodilurus*, *Merrem. Dracæna Guinensis*, *Daud. Lacerta Dracæna*, *Bonnat.*

South America.

CROCODILURUS, Spix. Scales of the back equal; "teeth on the inside of the jaws;" rest like *Ada*.

*Crocodilurus amazonicus*, Spix. Braz.

## Fam. 2. LACERTINIDÆ.

Head shielded; superorbital plate rigid; throat scaly; tongue exsertile, tip longly forked.

*A.* Collar distinct; dorsal scales somewhat granular; nostrils erect, lateral, subapical; ventral shields broad, smooth; toes simple.

*Zootoca*, Wagler. *Lacerta*, Linn. Nostrils, in the suture of two scales, placed on the sides of the nose; abdominal shields square.

\* *Dorsal scales rather long, 6-sided.*

*Zootoca muralis*. *Lacerta vivipara*, Jacq. *L. crocea*, Wolf. *Sturm's Fauna*, t. 4. *L. pyrrogaster*, Merrem. *L. agilis*, Pennant. Male in summer. *Lac. œdura*, Sheppard.

Var. *Lacerta nigra*, Wolf. Black, nearly uniform.

Inhab. England, Germany. Var. Ireland.

See also *Lacerta Saxicola*, Eversman, Mem. Mosk. iii. t. 30. f. 1.

\*\* *Dorsal scales small, broad, 6-sided.*

*Zootoca quadrilineata*, Gray. Collar continuous, even; ventral shields 6-rowed, middle row rather the narrowest, green, with irregular, unequal black spots.

Inhab. Sardinia.

LACERTA, Linn. Bonap. *Lacerta* and *Podarcis*, Wagler. Nostril erect, in the suture of three scales, placed on the side of the muzzle; abdominal shields square, two central series narrower, with oblique sides.

a. *Dorsal scales ovate, short, thick, smooth, convex.*

\* *Abdominal plates 8 or 10-rowed (Lacerta).*

*Lacerta ocellata*, Daud. Edw. t. 202. Pet. Gaz. t. 92. f. 1. *Podarcis ocellata*, Wagler. Jun. *Lacerta Lepida*, Daud. iii. t. 37. f. 1.

Inhab. South of Europe.

*Lacerta Senegalensis*. Very like the former, but twice as large.

Inhab. Senegal.

\*\* *Abdominal plates 6-rowed.*

*Lacerta lævis*, Gray. Greenish-grey, beneath greenish-white; dorsal scales roundish, 6-sided, convex; præanal plates with an arched series of 6 rather large shields in front.

Inhab. —.

b. *Dorsal scales elongate, keeled; throat scales large, broad.* *Podarcis*.

*Lacerta viridis*, Linn., Daud. iii. t. 34. *Podarcis viridis*, Wagler. *Lacerta varius*, Edw.

Var. 1. *Lac. bilineata*, Daud.

Var. 2. *Lacerta fusca*, Daud.

Inhab. Europe.

*Lacerta agilis*, Linn.? Lichst. Lac. Europæ, Pallas.

Var. 1. *Lac. stirpium*, Daud. iii. t. 35, f. 2.

Var. 2. *Lac. arenicola*, Daud. iii. t. 38, f. 2.

Inhab. Europe, England.

See also *Lacerta longicaudata*, Ruppell. Mus. Francf.

TEIRA, Gray. Nostrils erect, in the suture of three scales, lateral; abdominal shields (6-rowed) all square; throat scales small; toes simple.

*Teira punctata*. *Lacerta Dugesii*, Edw. Ann. Sci. Nat., t. 6, f. 2.? Dark, blackish-green, darker on the sides, closely and minutely white speckled, beneath pale green; caudal scales obscurely keeled.

Inhab. Europe; Madeira?

EREMIAS, Fitz. Nostrils in the suture of three scales, lateral; abdominal plates with the outer side oblique and contracted behind; temple scaly; præanal scales two, small, triangular, one behind the other, with oblong four-sided shields on each side of them.

\* *Abdominal shields 6-rowed; muzzle short; dorsal scales small; smooth, ovate.* Nucras.

*Eremias Lalandii*. *Lacerta Lalandii*. Edw. Ann. Sci. Nat. t. 5, f. 6., t. 8, f. 5.

Inhab. Cape of Good Hope.

\*\* *Abdominal shields 14 or 16-rowed; scales smooth, small.* Eremias.

*Eremias velox*. *Lacerta velox*, Pallas.

B. Collar distinct. Dorsal scales rather granular. Nostrils horizontal in the keel on the sides of the muzzle. Toes fringed. Ventral shields oblique.

SCAPTEIRA, Fitz. Ida, Gray, MSS. Brit. Mus. Nostril in the upper edge of the first labial shield, with two small shields above and behind it; præanal shields numerous; abdominal shields rhombic, the central ones often narrowed on both sides behind; toes fringed on the outer side; the claws very long, acute.

a. *Præanal shields broad; three of the central series placed one behind the other; abdominal shields 8-rowed, rhombic.*

\* *Dorsal scales large.*

*Scapteira inæqualis*. (*Ida inæqualis*, MSS. B. Mus.) Savigny Rept. Egypt, t. 1, f. 10? Pale olive; black dotted; scales of the back large, rhombic, keeled; of the sides small, keeled; tail very long, slender.

Inhab. N. Africa, Egypt.

\*\* *Dorsal scales small.*

*Scapteira pulchella*. (*Ida pulchella*, Gray, MSS. Brit. Mus.) Savigny, Rept. Egypt, t. 2, f. 2.? Olive (under the epidermis brown); back with six longitudinal whitish streaks, and intermediate series of irregular unequal white spots; limbs white spotted, beneath white.

Inhab. Egypt.

*Scapteira lineata*. (*Ida lineata*, Gray, MSS. B. M.) Greenish; back and base of the tail with six bright blue longitudinal streaks; beneath yellowish; scales of the back rather large, rhombic, keeled; of the base of the tail short, sharply keeled.

Inhab. N. Africa.

b. *Præanal shields similar, but narrower; abdominal shields 10 or 12-rowed, contracted behind; interparietal plate rudimentary.*

*Scapteira maculata*. (*Ida maculata*, Gray, MSS. B. M.) Savigny Rept. Egypt, t. 1, f. 9.?? Greenish, with a broad pale dorsal streak, marked with indistinct blackish spots; sides of the back blackish, with three or four series of longitudinal oblong pale spots; scales of the back small, rhombic, acutely keeled; of the base of the tail broad, short; toes slightly fringed.

Inhab. Tripoli.

c. *Præanal shields unequal; the hinder central one large, the rest smaller, placed in an arched series; abdominal plates, 12-rowed.* *Ida.*

*Scapteira inornata*. (*Ida inornata*, Gray, MSS. B. M.) Greenish olive; tail paler, with a dark streak on each side; beneath silvery white; scales of the back small, ovate, acutely keeled; of the base of the tail broad; præanal scales 10 or 12, subequal, with small scales on the sides, placed in four transverse subalternating series.

Inhab. Tripoli.

*Scapteira punctulata*. (*Ida punctulata*, Gray, B. M.) Olive; back with six longitudinal series of small distant blackish dots; tail and cheeks brown varied; beneath whitish; scales of the back small, convex, rather rhombic, smooth; of the tail elongate, narrow.

Inhab. —.

*Scapteira nebulosa*. (*Ida nebulosa*, Gray, MSS. B. M.) Pale olive; back with three series of rather large distant black spots; tail elongated, with a series of black dots on each side; scales of back minute, granular, smooth, flattish, of upper part of tail elongated, truncated.

Inhab. Egypt.

*Scapteira leiocerca*. (*Ida leiocerca*, Gray, MSS. B. M.) Olive black, varied with brown, leaving six series of small round pale spots, and six series of large oblong transverse pale spots, placed between the others; scales of the back small, rhombic, acute, smooth; of the base of the tail large, similar, smooth.

Inhab. —.

[ The toes of *S. inornata* are longly, of *S. inæqualis*, *S. maculata*,



*S. lineata*, and *S. leiocerca* shortly, and of *S. pulchella*, *S. punctulata*, and *S. sabulosa* scarcely fringed.

**MEROLES**, Gray. Nostrils horizontal, marginal, between two scales; the lower one placed over the first and second labial shield, and with a small triangular scale at its hinder edge; præanal shields numerous; central ones in a longitudinal series; abdominal shields rhombic; toes fringed on the outer side; dorsal scales small, rhombic, keeled; abdominal plates 12 or 14-rowed.

\* *Interparietal plate large.*

*Meroles Knoxii*. *Lacerta Knoxii*. *Edw. Ann. Sci. Nat.* t. 6. f. 8. Inhab. S. Africa, Cape of Good Hope.

\*\* "*Interparietal plate rudimentary.*"

*Meroles Dumerilii*. *Lacerta Dumerilii*. *Edw. Ann. Sci. Nat.* Inhab. Senegal.

**C.** Collar none, with a small axillary plait on each side, sometimes obsolete. Dorsal scales lanceolate, keeled. Nostrils superior subapical.

**MESALINA**, Gray. Nostrils marginal, convex, in the centre of three small unequal nasal scales, placed over the first labial plate; loreal shields 2, first linear, hinder triangular; scales of back small, convex; ventral shields subrhombic, 2 central series narrower; præanal shield single, surrounded by a series of 4 or 6 small ones, and then some smaller scales; toes slender, nearly simple; claws long.

*Mesalina Lichtensteinii*. Olive, beneath whitish; abdominal shields 8-rowed; scales of the back ovate, rhombic, convex, smooth; of the tail rhombic, elongate, slightly keeled.

Inhab. N. Africa?

**D.** Collar indistinct, united to the chest in the middle, with a distinct plait before each shoulder; dorsal scales rhombic, keeled.

**CABRITA**. Nostrils in a horizontal suture, between two small nasal shields, having a smaller one behind them. Collar adnate in the middle, free on the sides; præanal shield single, surrounded by five small shields in front; scales of the back rhombic, keeled.

*Cabrита brunnea*. Ventral shields 6-rowed, central ones narrowed on each side; middle of the back bay; sides dark brown, with two rather wider white streaks on each side; tail and limbs pale brown, beneath silvery.

Inhab. —.

Collection of Thomas Bell. Esq.

**ALGIRA**, Cuv. *Psammuris*, Wagler. Nostrils small in the horizontal suture, between two nasal scales, which have two others at their hinder side, so that it appears nearly in the centre of four small shields; ventral shields six-sided; scales of the back broad, rhombic,

keeled; two central præanal shields largest, placed one behind the other, rest smaller.

*Algira punctata*, Gray. Olive-green, sides pale, black-spotted, with two white streaks on each side; temples scaly, with two small shields.

Inhab. Shores of the Mediterranean.

*Algira Cuvieri*, Gray. Olive-green; sides black, with three narrow green streaks; side of the back black and white-spotted; ventral shields silvery, with a central black spot; temple unequally shielded.

Inhab. ———.

Mus. Frankfurt.

PSAMMODROMUS, Fitz. Nostrils in the suture between two unequal nasal plates; ventral shields ———?; scales of the back acute, keeled; præanal shields, one large, surrounded by many small ones; collar none; a band of shields close to the front of the chest, and only separated from them by a series of small scales, which are hidden, except when the head is bent back.

*Psammodromus Hispanicus*, Fitz.

Inhab. Spain.

Mus. Frankfurt.

[To be continued.]

XXXI.—*Characters of Nine new Species of Glumaceæ.* By Dr. C.

G. NEES v. ESENBECK, President of the Imperial Academy *Naturæ Curiosorum*. Extracted from a Letter to Professor Lindley.

*Melica colpodioides*; panicula composita et decomposita (ante anthesin contracta), pedicellis nudis scabro-puberulis, spiculis oblongis bi-trifloris, glumis inæqualibus obtusiusculis, superiori flosculos subæquante, valvula inferiori flosculorum perfectorum apice brevi spatio membranaceo-appendiculata 7-nervi, flosculo supremo sterili, sublineari, antheriformi! foliis anguste linearibus vaginisque scabris. (*M. scabræ et pallidæ* H. et K. affinis.)—California, Douglas.

α, sesquiflora.

β, subtriflora.

*Lophochlæna californica*. Ch. Gen. Spiculæ multifloræ, rhachilla articulata. Glumæ 2, membranaceæ, obscure 1—3-nerves, flosculis breviores. Flosculi callo truncato inserti, omnes perfecti: valvula inferior chartaceo-rigida, plurinervis, apice membranacea, bifida, lobis præmorso-dentatis, inter lobos setigera seta recta; superior plano-complicata lateribus in medio dentato-laceris apicem versus serratis; apice emarginato. Lodiculæ truncatæ, connatæ. Stamina 3 (antheris violaceis). Ovarium oblongo-lineare, glabrum; styli breves, discreti; stigmata parva plumulosa. Inflorescentia: racemus simplex, secundus. Gramina mollia. Folia brevia. Spiculæ bro-